CONDITION OF LONGLEAF COMMUNITIES IN THE SOUTHEAST

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ABSTRACT: The objective of this study was to determine the condition of the remaining longleaf habitat and to document relationships between that condition and location, ownership and burning history. Naturally regenerated longleaf pine stands were randomly selected for sampling from all the stands dominated by longleaf on the Forest Inventory and Analysis (FIA) plots maintained by the U.S. Department of Agriculture, Forest Service. Most stands had a mixture of different size classes with 70 to 80 percent containing at least three sizes and over 50 percent containing trees of all sizes (seedling, sapling, pole, and sawtimber). Nearly all stands had either sapling or seedling size regeneration. Older trees were not very prevalent in Florida or Georgia, where about 10 percent of the stands contained longleaf older than 90 years. North Carolina had the greatest percent of stands with trees larger than 50 cm diameter, while Florida had the least. Seventy percent or more of the longleaf understory on public owned lands was rated as fair to good condition, while less than half of private lands were rated fair or above. Significant disturbance to the soil and understory was most prevalent on private lands and quite rare on public lands. Recent use of tire was found on most public lands, but fire was much less common in private held longleaf stands. Because of soil disturbance and infrequent burning, many private lands containing longleaf are likely to suffer further habitat degradation. The potential exists also for significant loss, since most of the longleaf stands have trees in the sawtimber and pole size class that are vulnerable to immediate harvest.

INTRODUCTION

Longleaf pine ecosystems once occupied as much as 25 million hectares in the southeastern United States, extending south from southeast Virginia to central Florida and west into eastern Texas (Stout and Marion 1993). Longleaf pine was native to a wide range of ecosystems including wet flatwoods and savannas along the Atlantic and Gulf coastal plain and higher droughty sand deposits from the fall line sandhills to the central ridge of Florida (Stout and Marion 1993). Longleaf pine even extended onto the mountain slopes and ridges of Alabama and northwest Georgia, where it was found growing at elevations up to 600m (Boyer 1990). Logging of the valuable longleaf pine forests began in colonial times, reached a peak shortly after 1900 (Ware and others 1993). Clearing of forestland for urban and agricultural uses, conversion to loblolly and slash pine plantations, and harvest without regeneration all contributed to the continuous decline of the once dominant forest type of the south. By 1935, only about 8.1 million hectares of longleaf pine forest remained. The amount declined to 4.9 million hectares in 1955, 1.5 million hectares in 1985 (Kelly and Bechtold 1990), and 1.2 million hectares in 1995 (Outcalt and Sheffield 1996).

Prior to landscape fragmentation brought by human habitation, fire was a frequent, natural occurrence across much of the Southeast maintaining extensive longleaf pine and grass communities. Without fire, plant community composition and structure changes, as woody species increase and grasses and forbs decline. It is widely recognized that loss of longleaf habitat plus decline in health of remaining areas due to lack of tire, would lead to widespread endangerment of the myriad of species that use the longleaf ecosystem. The objective of this study was to determine the condition of the remaining longleaf habitat in the southeast and to document relationships between that condition and location, ownership and burning history. This information should be useful in developing a strategy for maintaining and/or restoring longleaf habitat in this region.

METHODS

All sampling was based on the network of FIA plots in Florida, Georgia, South Carolina, and North Carolina, which have been established by the U.S. Department of Agriculture, Forest Service, Southern Research Station. To obtain a proportionate sample of all major forest types, sites, and ownership classes in each state, scientists systematically distributed permanent plots across all ownerships. For this study, all plots in the selected states with a longleaf-dominated overstory that resulted from natural regeneration were sorted into 5 age groups: I-10, 11–20, 21–40, 4 I-60, and 60+ years. Age groups were classified by soils and topography into site types, which varied from state to state but were grouped into wet lowlands, dry sandhills, and rolling uplands.

Within each age class and site type, 3 stands were randomly selected for sampling. In Florida, we sampled 45 stands while 30 stands each were sampled in Georgia, South Carolina, and North Carolina. Tree density and size was sampled in 10 randomly located circular plots in each stand. We also recorded any evidence of past soil disturbance or recent fire. The condition of the understory community was determined by general appearance, dominance of typical native species, and amount of human disturbance. Data were summarized and percents calculated for each state by ownership class, i.e., public or private.

RESULTS

A number of the stands were converted to other uses before we could sample them. The losses were highest in Georgia where 25% of the selected stands were cleared for agricultural or urban uses. About half of all sample stands had more than 25 sawtimber sized (>22 cm diameter) trees per hectare while 75% had at least some sawtimber on them. The majority of stands were multisized or all aged with about 50% containing longleaf from seedling to sawtimber size in Florida and Georgia and about 70% in North and South Carolina. Natural regeneration was present in at least 90% of the sampled stands as either seedlings or saplings (<10 cm diameter). North Carolina had the greatest proportion of stands with mature trees (>90 years) at 28% while Georgia (10%) and Florida (12%) had the lowest percentage of stands with old longleaf trees. Trees larger than 50 cm diameter were found in over 20% of longleaf stands in Georgia and North Carolina, but were very rare in Florida (2%).

The majority (80%) of sampled longleaf stands were in forested areas with only a small fraction surrounded by non-forest agricultural or urban landuses. Georgia longleaf stands had fewer recent human caused disturbances (20%) than the other states where about 40% of the sampled stands had moderate to severe disturbance to soils and vegetation. This disturbance was much more prevalent on private lands where it ranged from a low of 25% in Georgia to a high of 75% in Florida. Less than 15% of public lands had evidence of recent soil or vegetation disturbances other than fire. Fire, however, was quite common on public lands where over 80% had been burned within the last 5 years. Burning of privately owned longleaf stands was highest in Georgia (48%), intermediate in Florida (35%) and South Carolina (30%), and lowest in North Carolina (15%). Average shrub height was influenced by burn history with a mean height of 3.0m in unburned stands and 2.0m in those recently burned. The majority of public longleaf stands had an understory in good or fair condition while many private longleaf stands were judged as poor or very poor in understory health.

CONCLUSIONS

Natural stands of longleaf continue to disappear in all four southeastern states due to conversion to other species or land uses. Losses appeared highest in Georgia because the survey used for selecting stands was 8 years old while others had been done in the last 3 to 4 years. Those natural stands of longleaf that remain are a mixture of size and age classes. Most longleaf stands have regeneration, indicating that recruitment is occurring to replace trees that die. Mature longleaf pine, those greater than 90 years old, are not very prevalent, which means the old growth that does exist has a high ecological value. Most of the remaining stands are in forested settings, which should make application of the prescribed burning needed to maintain ecosystem health easier. Burning, however, is not being used on many of the privately owned longleaf stands, while they are receiving significant amounts of degrading soil disturbance. In addition, many contain trees in the pole and sawtimber size class, which make them vulnerable to immediate harvest. All these factors stress the need for a continued effort to provide information and assistance to landowners to help them make informed decisions.

LITERATURE CITED

Boyer WD. 1990. Longleaf pine. In: Burns RM, Honkala BH, tech. coords. Silvics of North America, Volume 1 Conifers. USDA, Forest Service, Washington, DC, Agriculture Handbook 654:405-412.

Kelly, J.F., and W.A. Bechtold. 1990. The longleaf pine resource. Pages 11-22 *in* R.M. Farrar, Jr. (ed.). Proceedings of the Symposium on the management of longleaf pine. General Technical Report SO-75, U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station, New Orleans.

Outcalt, K.W., and R.M. Sheffield. 1996. The longleaf pine forest: trends and current conditions. Resource Bulletin SRS-9, U.S. Department of Agriculture, Forest Service, Southern Research Station, Asheville, NC.

Stout, I.J., and W.R. Marion. 1993. Pine flatwoods and xeric pine forests of the southern (lower) coastal plain. Pages 373-446 in W.H. Martin, S.G. Boyce, and A.C. Echternacht (eds.). Biodiversity of the southeastern United States: lowland terrestrial communities. John Wiley and Sons, New York.

Ware, S., C. Frost, and P.D. Doerr. 1993. Southern mixed hardwood forest: The former longleaf pine forest. Pages 447-493 *in* W.H. Martin, S.G. Boyce, and A.C. Echternacht (eds.). Biodiversity of the southeastern United States: lowland terrestrial communities. John Wiley and Sons, New York.